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AN

ACCOUNT

OF THE

ORIGIN

AND

PROGRESSIVE IMPROVEMENTS

OF THE

DIATONIC SCALE,

OR

SYSTEM OF MUSIC;

AND HOW THE PRESENT

MODERN SYSTEM OF TEMPERATURE
CAME TO BE ADOPTED.

ALSO THE

ELEMENTS

OF

TUNING

THE

HARPSICHORD, ORGAN,

AND

PIANO-FORTE.

WITH

A NEW SCALE.

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ELEMENTS

OF

TUNING, &c.

SYSTEM of *Muſic* among the *Ancients*, was a Term given to a Compound *Interval*, or an Interval compoſed, or conceived to be compoſed of ſeveral leſs; ſuch as the *Octave* or *Diapaſon*, which is not only the greateſt Interval, but the firſt in Perfection. On the contrary, *Diaſtem* was a ſimple Interval, without any component Parts.

As there is not any Interval in the Nature of Things, ſo we can only conceive any given Interval, as compoſed of, or equal to, the Sum of ſeveral others.

This Diviſion of Intervals therefore, only relates to Practice; ſo that a *Syſtem* is properly an Interval, which is actually divided

The ANCIENT DIAGRAM or Scale of Muſic of the Greeks.

Proſlambanomenos,
Hypate-hypaton,
Parhypate-hypaton,
Lychanos-hypaton,
Hypate Meſon,
Parypate Meſon,
Lychanos Meſon,
Meſe,
Trite Synemmenon, or Parameſe,
Paranete Synemmenon,
Nete Synemmenon,
Paramoſe,
Trite Diezeugmenon,
Paranete Diezeugmenon,
Nete Diezeugmenon,
Trite Hyperbolœon,
Paranete Hyperbolœon,
Nete Hyperbolœon.

There were alſo, among the *Ancients*, the *Genera* of Muſic, which were Three, viz. The *Chromatic*, *Enharmonic*, and *Diatonic*. The firſt and ſecond of which were variouſly ſubdivided into Species.

The *Diateſſaron* or 4th, being their leaſt Interval, which they admitted as a Concord; and therefore they ſought firſt how that might be conveniently divided, from whence they conſtituted the *Diapente* or 5th, and *Diapaſon* or Octave.

The *Diateſſaron* being thus, as it were, the Root and Foundation of the Scale, what they called the *Genera* or Kinds, aroſe from its various Diviſions, and hence they define the *Genus Modulandi*, the Manner of dividing the *Diateſſaron* or *Tetrachord*, and diſpoſing its four Sounds as to Succeſſion.

The Difference of the three *Genera* among the Ancients, conſiſted in the different Diviſions and Diſpoſitions of the *Tetrachord*.

In the *Enharmonic*, the leaſt Interval was the fourth Part of a Tone; in the *Chromatic*, the

in Practice, and in which, along with its Extremes, we conceive always ſome intermediate Terms.

The Nature of a *Syſtem* will be very plain, by conceiving it an *Interval*, whoſe Terms are in Practice taken either in immediate Succeſſion, or the Sound is made to riſe or fall from one to the other, by touching ſome intermediate Degrees; ſo that the whole is a *Syſtem* or Compoſition of all the *Intervals* between one *Extreme* and the other.

There are alſo different Sorts of *Syſtems*, ſome of which are called *Concinnous*, and others *Inconcinnous*. *Concinnous Syſtems* are thoſe, which conſiſt of ſuch Parts as are fit for *Muſic*; and thoſe Parts placed in ſuch Order between the *Extremes*, as the Succeſſion of the Sounds from one Extreme to the other, may have a good Effect.

Inconcinnous Syſtems are thoſe, wherein the ſimple Intervals are badly diſpoſed between the two *Extremes*, and therefore not ſo fit for Muſic.

There

Melody; that is, the Conſonant and Diſſonant Intervals into their Concinnous Parts.

In the firſt State of the *Lyre*, which is generally allowed to be the firſt ſtringed Inſtrument, the *Diateſſaron* or *Tetrachord* * was the greateſt or general *Syſtem*; which was called by *Boetius* the *Syſtem* of *Mercury*, becauſe ſuppoſed to be invented by him, about the two thouſandth Year of the World.

This *Syſtem* ran through many Hands, and roſe to a *Seventh*, in which were two conjoint Fourths or *Tetrachords*.

But it was ſoon diſcovered that a *Seventh* had not Compaſs ſufficient to expreſs the *Sounds* of a *Human Voice*, wherefore an *Eight* Chord was added by *Pythagoras*, and the *Syſtem* by Degrees was encreaſed by others to a *Biſdiapaſon* or Double Octave.

Between the two loweſt Chords of each Fourth there was an *Interval* of five Commas,

* A Concord conſiſting of three Degrees or Intervals, and four Terms or Sounds; called by the Ancients alſo (more properly) Diateſſaron, and by the Moderns a Fourth.

or

the third Part of a Tone called *Dieſis Chromatica*; and in the *Diatonic*, the *Semitone* is the leaſt Interval.

There is a Fourth or additional *Species*, which the *Grecians* gave the Name of *Syntono:* this was a Mixture of the *Diatonic* and *Chromatic*, and what the Italians call *Syſtema Temperato* or *Participato*, becauſe founded on *Temperature*, or what we call *Bearing*; that is, on the Diminution of ſome Intervals and the enlarging of others: this, with ſome later Alterations, is nearly what is now called the *Modern Syſtem*; but of this more hereafter.

The *Octave* or *Diapaſon* being indiſputably allowed to be the moſt Concinnous and perfect *Syſtem* with reſpect to the Agreement of its *Extremes*; ſo that how many Octaves ſo ever are added and ſubdivided, they are all added and ſubdivided the ſame as the firſt; and when we once know how the Octave is divided, we know the Nature of the *Diagram* or *Scale*; the Varieties whereof conſtitute the *Genus Melodie*, which is a certain Manner of dividing and ſubdividing the Principles of Melody;

The Diſciples of *Pythagoras* contended, that *Reaſon* was the only *Criterion* to judge of Sounds, and their *Proportion*; and that conſequently, they admitted none but what they could demonſtrate, either *Arithmetically* by *Numbers*, or *Geometrically* by *Lines*; and that therefore the Fifth, and many other Intervals, muſt have a due Proportion, and be tuned exactly Conſonant.

Ariſtoxenus (*Ariſtotle's* Follower) a little Time after, thinking that as *Sound* was the chief Object of the Ear, the Ear therefore was the propereſt Judge, gave himſelf no Trouble about what the *Pythagoreans* ſaid of *Reaſon*; obſerving, that if the *Fifth* was too great or ſtrong, or the *Fourth* too ſmall or weak, they did not greet the *Ear* with Pleaſure. And again, thinking that as the Ear could not find any very ſenſible Difference between Tones *Major* and *Minor*, it was needleſs to divide them in that Manner, and thereupon fixed them on an Equality.

At length *Ptolemy* and *Didymus*, ſeeing that the *Pythagoreans* and *Ariſtoxenians* gave into Extremes in their Opinions, equally abſurd,

or a Semitone Major; and between the two higheſt, only four, or a Semitone Minor; and between the two middle ones there was a Tone Major. In this State the *Syſtem* was called *Diatonic*; that is, proceeding by, or compounded of, Tones and Semitones, and therefore very eaſy to ſing.

But as there was a Tone Major between their *Meſe* and *Parameſe*, which was about the middle of their *Syſtem*; that is, between our F and B, (as we now call them) which made the Fourth from F to B, redundant and diſagreeable; another Fourth was inſerted, to make a Sound fall between them, and divide that Tone into two Semitones, one Major, the other Minor, which now is our B flat; this put *Timotheus* of Mileſus upon dividing the Intervals C and D and F and G, which were the middle Chords.

It is neceſſary here to obſerve that the Ancients differed greatly in their Opinions of *Sounds*, which in ſome Meaſure retarded the *Improvements* of their *Syſtem*.

The

Minor; therefore there was a Sort of a Chaſm or Void in each *Tetrachord.*

Olympus therefore, conſidering the Diviſion of the Tones *Major*, thought that the Tones *Minor* might alſo be divided; and placed a Chord between the two loweſt Sounds of each *Tetrachord*; that is, between B and C, E and F, and another between the Second *Diatonic* of each Fourth and the *Chromatic*, which was a Semitone higher than the *Diatonic*; and hence aroſe the *Enharmonic Genus* with its *Dieſis* or Quarter Tones. In this the Fourth was compoſed firſt, of four *Diatonic* Chords, B, C, D, E; ſecondly, of one *Chromatic*, a Semitone higher than C; and laſtly, of two *Enharmonics*, the ſecond whereof divided the Semitone between C natural and C ſharp into Quarter Tones.

As to the Intervals between C ſharp and D, and that between D and E, they were not divided in the Ancient *Syſtem*, in regard they were thought very ſmall Intervals, and incapable of ſuch Diviſion.

taught that *Senſe* and *Reaſon* were to be conſidered not as entirely Subject to each other, but as inſeparable Companions, that muſt mutually agree to form a true Judgment of *Sounds*.

This Conſideration ſet them to Work (though ſomething differently) to fix the Ancient *Diatonic Syſtem* in ſuch a Manner, as that *Reaſon* and the *Ear* might be ſatisfied, or at leaſt contented at the ſame Time: they, by reciprocal Aſſiſtance made a new *Syſtem*, by the Italians called *Syſtema Reformata*.

It muſt be obſerved *Firſt*, that in all theſe *Syſtems* the Fourth was compoſed *Diatonically* of three Intervals, one Semitone, one Tone Major, and one Minor.

Secondly, that *Ptolemy* and *Didymus* among all their Reformations, thinking that the Tone *Minor* could not be divided into two *Semitones*, put only one *Chromatic* Sound in the *Fourth*, which divided the Tone Major into two Semitones, one Major, the other Minor;

whence it was vulgarly called the *Gammut*. He alſo added the Names of Ut, Re, Mi, Fa, Sol, La, to the Notes. Hence came thoſe barbarous Names, of Gamut, A-re, B-mi, &c. He alſo made Notes, and placed them on Lines and Spaces. In this *Syſtem*, he makes an Addition of ſeveral Chords above and below, which increaſed the Number of Sounds or Notes from 15 or 18 to 22. It was afterwards found neceſſary to add a Seventh Syllable, viz. Si, to Guido's Sixth, by means whereof every Sound of the Octave could then be eaſily expreſſed.

This *Syſtem* was very ingenious, having eaſed us of ſome Difficulties, which, ſays the celebrated Mr. *Broſſard*, the Ancient Syſtems were troubled with, and is what has been ſo univerſally received and generally uſed for above ſix Centuries. Notwithſtanding all this, there were ſome Inconveniences attending it.

The firſt was, being obliged to uſe different Names to the ſame Notes. The ſecond was, that there were no *Chromatic* Chords therein but B flat.

It

This then, according to the moſt general Opinion, was the State of the Ancient *Syſtem*. When the *Grecians* finding the Names of the *Sounds* (a many of which were Words of five or ſix Syllables) inconvenient, by reaſon of their Length, ſubſtituted the Letters of their Alphabet in their Stead; but the Latins thinking thoſe too great a Burthen, made uſe of fifteen of their Letters, as far as P, and thus formed a Second *Syſtem*, differing from the firſt in nothing but the different Characters.

Soon after this, *Pope Gregory* obſerving that the Sounds H, I, K, L, M, N, O, P, were only a Repetition of thoſe marked A, B, C, D, E, F, G, an Octave higher, reduced all to the ſeven firſt Letters; and theſe were repeated higher or lower as the Song required, but ſtill all on the ſame Line.

At length *Guido Aretine* invented a Third *Syſtem*, which ſoon threw the other two out of Uſe, and was partly ſimilar to the Modern *Syſtem*. The firſt Note of this *Syſtem*, *Guido* gave the Greek Name of Gamma-ut, from whence

were almoſt neceſſary to give Pleaſure and make the Piece agreeable; and as they often cauſed a diſagreeable Pronunciation of the Words of a Song; the famous *John de Muris*, Doctor at Paris, or as ſome ſay, one *Franco*, a Scholaſtic Teacher or Magiſter at Liege, invented Notes of different Lengths, about the Year 1333, which brought *Guido's Syſtem* more in Perfection. But there ſtill wanted a Fourth *Syſtem* to be formed, in which more Chromatic Notes were wanting, and a farther Extenſion of the *Biſdiapaſon* or *Double* Octave.

At laſt, a very learned Man (whoſe Name the famous *Bontempi* ſays is not mentioned in Hiſtory) perceiving that the *Ear* was not diſpleaſed, if the *Fifth* was a little diminiſhed, found out an admirable *Temperament*, which rendered the Second *Tone* of the *Fourth* equal to the Firſt, by giving the Fourth a little greater Extent than it naturally had from its Mathematical Form of 3, 4; which Tone conſequently admitted one Chromatic Chord and divided it into two Semitones. This Fourth *Syſtem* is called by the Italians *Syſtema Temperato*, or *Participato*.

By

It is much to be wondered at, that *Guido*, who was ſo well verſed in the *Grecian Syſtem*, did not at leaſt introduce more than one *Chromatic* Chord, ſince they are ſo neceſſary even in Harmony or Compoſition of many Parts; (the Invention whereof is moſt generally attributed to him) nay, 'tis almoſt impoſſible to make good Harmony without their Aſſiſtance.

The third Inconvenience was, the ſmall Extent of his *Syſtem*; for ſince they have compoſed in Parts, certain it is that neither the double Octave of the Ancients or *Guido's* Addition, have Compaſs ſufficient.

The laſt was, that all his Notes were almoſt of equal Value as to Time, therefore he could not diſtinguiſh that Variety of Meaſure and Time, (as at preſent) which are ſometimes the greateſt Beauties of a Song.

To remedy this Inconvenience, as the Equality of *Guido's* Notes rendered a Song too uniform, and deprived them of the Variety of Movements, quick and ſlow, which were

Octave as long as you pleaſe, it ſtill remains a Concord; yet it is not ſo with the 4th, 5th, 3d, or other Intervals, as they muſt keep their Meaſures or Rations belonging to them, or they are diſordered; which will appear by an arithmetical Inveſtigation of the Nature of Sounds and the Intervals of the Octave, when the Reaſon of thoſe *Anomalies*, or irregular Intervals, which are produced by changing the Key, will plainly appear. It is allowed that if only one Key was to be made uſe of, all its eight Notes might be tuned perfect Conſonances agreeable to the Diatonic Scale; but, as ſuch a *Syſtem* admits of no Modulation into different Keys for Variety or Change of Pitch, it was agreed on therefore, to abate ſomewhat of the Rigour of ſtrict tuning in the natural Key, and allow all others to depart, more or leſs, from a perfect Conformity to the *Diatonic Scale*; ſo that by diſtributing the Errors among the ſeveral Keys, their Quantity in each might be leſſened. Thus, inſtead of a perfect *Syſtem* of *one Key* only, a *tempered Syſtem*, that allows of *many Keys*, was adopted; the Departure from *ſtrict Tuning* in the ſeveral *Conſonances* being called *Temperaments*, *Accommodations* or *Bearings*, which

By the Help of this Addition, that is, of one Chromatic Chord, the Octave is diviſible into twelve Semitones, without any Void in or between the two Fourths whereof it is compoſed; and at the ſame Time, by Means hereof, Two of the *Genera*, viz. the *Chromatic* and *Diatonic*, are brought into One *Syſtem*, which has ſince been found a ſovereign Remedy for rectifying the Defects of all Muſical Inſtruments whoſe Sounds are fixed.

Mr. *Broſſard* ſays, it is ſtrange that the *Grecians*, who in all other Points of this Art ran ſuch great Lengths, did not think of introducing ſo ingenious, and at the ſame Time ſo natural an Invention, into their *Syſtem*.

In the farther ſettling or perfecting this Scheme, it required an infinite Deal of Care and Foreſight, as they found it impracticable to divide the Octave ſemitonically and tune the Intervals with exact Conſonnance, yet have the neceſſary Advantage of modulating into different Keys, without changing or diſplacing the mathematical Degrees of the Octave, which would produce incongruous Intervals: for though you may add Octave to

Octave

Enharmonic Genus of the *Ancients*, we ſhould be better able to raiſe certain Affections.

The grand Secret and Excellence therefore in Tuning, conſiſts in regulating or accommodating the *Temperaments* or *Bearings* in ſuch a Manner that all the Keys may have their wonted Quality and Effect. Thus, what was called or thought to be an Imperfection, and admitted out of ſeeming Neceſſity on one Account, brings with it an unforeſeen Advantage in the Variety of Characters it gives to the ſeveral Keys in *Muſic*. Some Mathematicians were for throwing out the *remote Keys* for not being perfect, and endeavoured to reform the reſt till they became alike inſipid; for the ſame Reaſon they might *proſcribe* and exclude *Diſcords* in Compoſition: the Truth is, that though the *Mathematics* may be an uſeful *Handmaid* to the finer Arts, that it will make but a *formal* and *tyrannical Miſtreſs*, and that the *Ear* is the chief *Criterion* to judge by or decide upon in Muſic.

all Profeſſors ſeem to agree are admitted out of Neceſſity, and are a Departure from perfect Harmony (the ſame as Diſcords) for the ſake of Variety and of that Pleaſure which ariſes from modulating out of the original or principal Key into a Variety of ſubordinate ones. By this Means every Key has a Character and Effect peculiar to itſelf, which ſeems to be the original Intent and Deſign of the Divine Author of Harmony. Theſe Characters and Effects are well known to good Compoſers of *Muſic*. Keys in the *Major* or ſharp Third, abounding with Flats, are ſolemn and majeſtic; on the contrary, thoſe with Sharps, are light and airy. Keys in the *Minor* or flat Third of the former Sort, ſuggeſt *deep tragic Woe*; if of the latter, they expreſs *pathetic, paſtoral Complaint*. The truth of this, is confirmed by the Examples and Practice of great *Maſters* and *Compoſers*, who being ſenſible of this, fix on proper Keys adapted naturally to their Subject, which do in Turn ſupport and eſtabliſh their ſeveral Characters, and thereby give true Scope and Expreſſion to their Genius and Deſign. There is alſo good Reaſon to ſuppoſe that if we could reach the

Enharmonic

Remarks on the New Scale.

THE Reaſon for beginning to tune the firſt 5th downwards in this Scale, is, becauſe the Ear is more capable of diſtinguiſhing the Degrees of Temperament that Way, and ſettling the Bearings with more Facility and Preciſion.

Another Reaſon was, that as the three firſt 5ths in this Plan are a Sort of Fundamentals to the other, whereby a Criterion is fixed for a Regulation of the Remainder, they ought to be ſettled with the greateſt Exactneſs; on which Account it was judged neceſſary to fix upon thoſe 5ths to begin with, which are the moſt eaſily ſettled; for when thoſe 5ths are tuned, the Remainder are regulated with great Certainty, by accommodating them with the 3ds in each of the Harmonical Triads they belong to; by which Means the common Chord belonging to every Note or Key (except the Extreme Keys, where the unavoidable Imperfection of the Inſtrument is judged neceſſary to be thrown) are made good. This, upon an Examination of the old Way of beginning to tune the 5ths upward, viz. from C to G, and G to D, &c. will plainly appear; for if the Bearings of thoſe two 5ths are not properly laid, the Keys of B b with 2 Flats, and E b with 3 Flats, will be very diſcordant.